CLAIMS

1. A method comprising:

receiving a request to play an audio file;

determining whether volume normalization parameters associated with the audio file are stored in a media library;

if the volume normalization parameters associated with the audio file are stored in the media library, retrieving the volume normalization parameters from the media library;

if the volume normalization parameters associated with the audio file are not stored in the media library, retrieving the volume normalization parameters from the audio file; and

applying the volume normalization parameters while playing the audio file.

2. A method as recited in claim 1 wherein the volume normalization parameters are associated with a playback volume of the audio file.

3. A method as recited in claim 1 wherein the volume normalization parameters identify a mapping function.

4. A method as recited in claim 1 wherein the volume normalization parameters include a peak volume level associated with the audio file.

5. A method as recited in claim 1 wherein the volume normalization parameters include an average volume level associated with the audio file.

6. A method as recited in claim 1 further comprising if the volume normalization parameters associated with the audio file are not stored in the media library and are not in the audio file, calculating the volume normalization parameters while playing the audio file.

7. One or more computer-readable memories containing a computer program that is executable by a processor to perform the method recited in claim 1.

8. A method comprising:

receiving a request to play an audio file;

determining whether volume normalization parameters associated with the audio file are stored in a media library;

if the volume normalization parameters associated with the audio file are stored in the media library:

retrieving the volume normalization parameters from the media library;

playing the audio file using the volume normalization parameters;

if the volume normalization parameters associated with the audio file are not stored in the media library:

determining whether volume normalization parameters associated with the audio file are stored in the audio file;

if the volume normalization parameters associated with the audio file are stored in the audio file:

retrieving the volume normalization parameters from the audio file;

playing the audio file using the volume normalization parameters;

if the volume normalization parameters associated with the audio file are not stored in the media library and are not stored in the audio file, calculating volume normalization parameters while playing the audio file.

9. A method as recited in claim 8 wherein if the volume normalization parameters associated with the audio file are not stored in the media library and are not stored in the audio file, saving the calculated volume normalization parameters in the media library.

10. A method as recited in claim 8 wherein if the volume normalization parameters associated with the audio file are not stored in the media library and are not stored in the audio file, saving the calculated volume normalization parameters in the audio file.

11. A method as recited in claim 8 wherein the volume normalization parameters include a peak volume level associated with the audio file.

12. A method as recited in claim 8 wherein the volume normalization parameters include an average volume level associated with the audio file.

13. One or more computer-readable memories containing a computer program that is executable by a processor to perform the method recited in claim 8.

14. A method comprising:

receiving a request to play an audio file;

identifying a mapping function associated with the audio file, wherein the mapping function includes a first portion and a second portion;

applying the first portion of the mapping function to audio data in the audio file when the amplitude of the audio data does not exceed a threshold value; and

applying the second portion of the mapping function to audio data in the audio file when the amplitude of the audio data exceeds the threshold value.

15. A method as recited in claim 14 wherein the second portion of the mapping function is a quadratic equation and the first portion of the mapping function is a linear equation.

16. A method as recited in claim 14 wherein applying the first portion of the mapping function to audio data in the audio file changes the amplitude of the data played from the audio file.

17. A method as recited in claim 14 wherein applying the second portion of the mapping function to audio data in the audio file changes the amplitude of the data played from the audio file.

18. A method as recited in claim 14 wherein applying the first portion of the mapping function and applying the second portion of the mapping function produce a substantially constant audio data volume.

19. One or more computer-readable memories containing a computer program that is executable by a processor to perform the method recited in claim 14.

20. A method comprising:

receiving a request to copy an audio file;

analyzing the audio file content;

calculating volume normalization parameters associated with the audio file, wherein the volume normalization parameters are calculated based on volume levels in the audio file;

storing the volume normalization parameters in a media library; and

saving a copy of the audio file to a storage device.

21. A method as recited in claim 20 wherein the volume normalization parameters are calculated based on volume levels in the audio file.

22. A method as recited in claim 20 wherein saving a copy of the audio file to a storage device includes saving the volume normalization parameters with the copy of the audio file.

23. A method as recited in claim 20 wherein saving a copy of the audio file to a storage device includes storing the volume normalization parameters in the copy of the audio file.

24. A method as recited in claim 20 wherein the volume normalization parameters are applied during subsequent playback of the copied audio file.

25. A method as recited in claim 20 wherein the volume normalization parameters are applied during subsequent playback of the copied audio file to provide a substantially constant volume level during playback of the copied audio file.

26. One or more computer-readable memories containing a computer program that is executable by a processor to perform the method recited in claim 20.

27. A method comprising:

identifying a plurality of audio files on a computer system;

analyzing the content of each identified audio file;

calculating volume normalization parameters associated with each identified audio file, wherein the volume normalization parameters associated with a particular audio file are calculated based on volume levels in the particular audio file; and

storing the volume normalization parameters in a media library.

28. A method as recited in claim 27 further comprising storing the volume normalization parameters with the associated audio file.

29. A method as recited in claim 27 further comprising storing the volume normalization parameters in a header of the associated audio file.

30. A method as recited in claim 27 wherein the method is performed by a media player application.

31. One or more computer-readable memories containing a computer program that is executable by a processor to perform the method recited in claim 27.

32. An apparatus comprising:

a volume normalization parameter calculator to analyze an audio file and calculate at least one volume normalization parameter;

a media library coupled to the volume normalization parameter calculator, the media library to store volume normalization parameters associated with audio files; and

a volume normalizer coupled to the media library, the volume normalizer to apply volume normalization parameters to normalize playback volumes of audio files.

33. An apparatus as recited in claim 32 wherein the volume normalization parameter calculator calculates a mapping function.

34. An apparatus as recited in claim 33 wherein a first portion of the mapping function is applied to audio data in the audio file when the amplitude of the audio data exceeds a threshold value, and a second portion of the mapping function is applied to audio data in the audio file when the amplitude of the audio data does not exceed the threshold value.

35. An apparatus as recited in claim 32 wherein the volume normalizer retrieves volume normalization parameters from an associated audio file.

36. An apparatus as recited in claim 32 wherein the volume normalizer retrieves volume normalization parameters from the media library.

37. An apparatus comprising:

means for receiving a request to play an audio file;

means for identifying a first normalization parameter associated with the audio file and identifying a second normalization parameter associated with the audio file; and

means for applying the first normalization parameter and the second normalization parameter during playback of the audio file.

38. An apparatus as recited in claim 37 wherein the first normalization parameter includes a peak volume level associated with the audio file.

39. An apparatus as recited in claim 37 wherein the second normalization parameter includes an average volume level associated with the audio file.

40. An apparatus as recited in claim 37 wherein the first normalization parameter and the second normalization parameter determine a volume level during playback of the audio file.

41. One or more computer-readable media having stored thereon a computer program that, when executed by one or more processors, causes the one or more processors to:

receive a request to play an audio file;

identify a first volume normalization parameter associated with the audio file, wherein the first volume normalization parameter includes a peak volume level associated with the audio file;

identify a second volume normalization parameter associated with the audio file, wherein the second volume normalization parameter includes an average volume level associated with the audio file; and

play the audio file while applying the first volume normalization parameter and the second volume normalization parameter.

42. One or more computer-readable media as recited in claim 41 wherein the first volume normalization parameter and the second volume normalization parameter are stored in the audio file.

43. One or more computer-readable media as recited in claim 41 wherein the first volume normalization parameter and the second volume normalization parameter are stored in a media library.